

Occupational Safety and Health Management Systems and their Compliance among Petrol Stations in Kenya. A Case Study in Nakuru County

Abstract

Companies have a legal and social responsibility to ensure the safety of its workers, all persons lawfully present at the workplace and the surrounding community. This requires laid down procedures and routing process which aims at identifying, eliminating, minimizing and control the work-related hazards and decrease the risks. To be effective, the Occupational Safety and Health Management Systems (OSHMS) need to be integrated within the organization's safety policy and objectives. Therefore, this explains why OSHMS has continued to play a pivotal role in the decision making process in most companies (Ibojiemenmen, 2007). This study aimed at assessing occupational health and safety management systems in place and their compliance. The sampling unit was petrol stations and the study employed use descriptive study design. The purposive sampling was employed to select thirty two (32) petrol stations in Njoro Molo and Nakuru Municipalities of Nakuru County with a special focus on petrol stations which have dispenser pumps, car servicing bay and Front Office section. Data was collected using purposive sampling, stratified and simple random where interviews, observations and questionnaire survey. Descriptive statistics which involved frequency tables and percentages was used to analyze the data. The findings of this study shows that more than half of the petrol stations lacked defined Occupational Safety and Management systems. There is need of Occupational Safety and Health Management System to be integrated within petrol stations policy in order to reduce the operations mistakes, costs of reducing problems and level of risks while ensuring that they comply with laws and regulations.

Key words: *BTEX; Compliance; Premium Motor Spirit; Occupational Safety and Health Management Systems*

INTRODUCTION

The number of petrol station has increased tremendously in the recent years in Kenya. These petrol stations are located in major routes and highways with passing traffic (Netz and Taylor, 2002), towns and busy shopping centers serving as a vehicle fueling and servicing point, food outlets and parking areas (Chan et al., 2015). Petrol stations have attracted large number of people both as staff and customers (Sartorius *et al.*, 2007); whereby some serves as a

32 designated booking place where Public service Vehicles (PSV) starts or ends its scheduled
33 route. This is despite the fact that petrol stations stores flammable materials, generates and
34 releases toxic substances which consist of a mixture of benzene, toluene, ethylbenzene, and
35 xylenes (BTEX) in all its operations (Health and Safety Authority 2017). The atmosphere around
36 the petrol stations contains high concentration level of BTEX due to emission of toxic fumes
37 during loading, storage, refueling, oil spill, exhaust fumes and leakages from Liquefied
38 Pressurized Gas (LPG) Cylinders; pose a high potential risk to the environment, staff and
39 general population (Robert *et al.*, 2014). Further, a study done by Jo and Song (2001) indicates
40 that exposure levels associated with gasoline vapour emissions in petrol service stations, car
41 service bay and petroleum refineries were higher than those associated with motor vehicle
42 emissions.

43 Apart from hazardous substances and fumes generated and release by petroleum products,
44 other health and safety risks found in and around petrol station include fire and explosion, lone
45 working, vehicle movements, lifting and carrying, slips, trips and falls (Health and Safety
46 Authority 2017). Efficient and effective operations gains at any workplace including petrol
47 stations are realized by organizations that move from simply attaining legal compliance towards
48 implementing of the best practices of safety and Health (Health and Safety Executive, 2006).
49 The good occupational health and safety practices should be in balance with socio-economic
50 needs of the workplace. A sound occupational health and safety management systems must
51 link workplace operations in order to effectively manage the business. The OSHMS aims at
52 eliminating where possible or minimizing the likelihood of work related accidents, diseases and
53 fatality cause by occupational hazards. Therefore, OSHMS encompasses monitoring,
54 assessment, identification and control of hazard, ongoing inspection and incident investigation,
55 emergency preparation and response to safeguard health of the workers and the public. It
56 addresses the anticipated safety concerns and gives a room for continual improvement of the
57 laid procedures and routing processes. The success of OSHMS depends on the commitment of
58 all stakeholders including and not limited to top management, workers and customers. Petrol
59 stations are required to establish a safety and health management systems which entails safety
60 policy and periodic risk assessment to its hazardous nature (Health and Safety Authority, 2017).
61 Fire incidences and explosions have been reported in petrol stations around the world. Notable
62 incidences include petrol stations fire incidences in Ghana in year 2015 and 2017 where a total
63 of 150 people and 3 people lost their lives respectively and dozens injured (BBC News, 2015).
64 In Kenya, tankers explosions have been report along our major roads and highways killing

65 dozens of people. Recently, a shell petrol station in Nairobi, Kenya, busted into flames.
66 According to statement issued by Energy Regulatory Authority, the fire started after the motorist
67 sped off while the pump was inside the vehicle's fuel tank; the friction between the ground and
68 the pump produced sparks which ignited a fire. Although no injuries were reported on the 14th
69 April 2018 incidence, however the station was extensively damaged. This has led to scrutiny on
70 the level of emergency preparedness and responds plan, work procedures, safety culture and
71 training which are part of issues addressed by OSHMS. There have been studies related to
72 health and safety in both petroleum industry and other sectors in Kenya. For instance,
73 Operational risks management in petroleum filling station by Magambo (2016) and Health and
74 safety assessment in Kenyan petrol stations by Mutua and Fedha (2012). However these
75 studies focused on examination and evaluation of operational risks management practices,
76 safety regulations awareness and management of physical controls to health and safety. Thus,
77 this study intent to fill the research gap by documenting safety and health management systems
78 in place and the compliance with existing safety regulations among petrol stations in Kenya.

79 **METHODOLOGY**

80 The study was conducted in Nakuru County and the sampling unit was petrol stations. The
81 purposive sampling was used to select thirty two (32) petrol stations in Njoro Molo and Nakuru
82 Municipality with a special focus on petrol stations which have dispenser pumps, car servicing
83 bay and Front Office section. A number of respondents were picked randomly and
84 proportionately drawn from each section in all petrol stations involved in the study to give a
85 desired sample size of one hundred and two (192) (Anderson *et al.*, 2007). The study used
86 descriptive study design. A pilot test had been conducted to five (5) petrol stations in Naivasha
87 subcounty to test the validity (Gay, 1987) and reliability (Fraenkel & Wallen, 2003) of the
88 research instruments.

89 Both primary and secondary data was used. Data was collected through use of interviews,
90 observations and questionnaire survey. Open and closed-ended questionnaires were used to
91 collect data from the respondents in forecourt, servicing and front office sections. Observational
92 checklist was used to observe safety practices, recording of the health risks and physical
93 structures and document records related to health and safety issues. The study used purposive
94 sampling to select two (2) key informants from DOSHS to get depth information and an
95 opportunity to clarify OHSMS issues arising from the interview process. The data collected from

96 the field was coded, organised and analysed using descriptive statistics which involved
97 frequency tables and percentages.

98

99 **RESULTS AND DISCUSSION**

100 **Results**

101 The study had set out to collect data from one hundred and ninety one (192) respondents but
102 only one hundred and eighty three (180) which were successfully filled were analyzed
103 representing 93.8% response rate. The study had more male respondents (76.1%) than female
104 (23.9%) while the majority of the respondents were from the age bracket of 18-25 years
105 (43.3%). Majority, 86.7% worked 8-10 hrs a day, 84.4% had worked 5 years and below while
106 over 90% of the respondent had received post primary education (Table 1)

107

Social economic characteristics of the respondents		
Variable	Frequency N=180	Percentage
Age (years)		
18-25 years	78	43.3
26-35 years	69	38.3
36 - 45 years	33	18.3
Sex		
Male	137	76.1
Female	43	23.9
Education		
Primary	16	8.9
Secondary	84	46.7

Tertiary	74	41.1
University	6	3.3
Work experience		
Below 1 year	76	42.2
1-5 years	76	42.2
6-10 years	28	15.6
Hours worked per day		
Below 8 hours	10	5.6
8-10 hours	156	86.7
11-12 hours	10	5.6
Over 12 hours	4	2.2

108 Table 1: Social economic characteristics of the respondents. *Source: Field data (2017)*

109 The findings of the study shows that all respondents, 180 (100%) were aware of the
 110 occupational hazards associated with their job where more than one hazard/risk were
 111 mentioned. Risk of fire reported by all respondents, 180 (100%) while commonest accident
 112 occurrence reported was fuel splash to skin and eyes, 162 (90%). Majority of the respondents,
 113 108 (60%) stated that employer provided PPE, out of which the commonest being
 114 Aprons/overall. In addition, 12 (6.7%) reported use of PPE with the most commonly used being
 115 apron/overall, 10 (83.3%) and the least used being gloves and face mask, 1 (8.3%) each as
 116 illustrated in Table 2 below.

117

Hazard/Risk Awareness, accidents experienced by respondents and use of PPE while at work		
Variable	Frequency (n)	Percentage (%)
*Type of hazards/risks	n=180	

Fire	180	100
Fuel contact with body	170	93.9
Inhalation of PMS	154	85.6
Oil spill	149	82.8
Run over by vehicles	117	65
Explosions	113	63
Cold	47	26.1
*Type of accident	n=180	
Fuel splash to skin and eyes	162	90
Slip and fall	22	12.2
Finger pinched/laceration by faulty pump handle	52	28.9
PPE provided	n=180	
Yes	108	60
No	72	40
*Type of PPE provided	n=108	
Aprons /overall	107	99.1
Reflector jacket	40	37
gloves	39	36.1
Safety boots	22	22.1
Face mask	18	16.7
Use of PPE	n=180	
Yes	12	6.7
No	168	93.3
*Type of PPE used while at work	n=12	
Aprons/overall	10	83.3
Reflector jacket	5	41.6
Gloves	1	8.3

Safety boots	7	58.3
Face mask	1	8.3
*Multiple responses		

118 Table 2: hazards awareness, accidents experienced and use of PPE. *Source: Field data*
119 (2017)

120

121 Most of the respondents 165 (91.7%) stated that they had specified work assignment where
122 staff had define job descriptions outlining how to perform their duties. However, from
123 observation checklist, multitasking was evident in most stations whereby staff from front office
124 and car servicing section could also been seen refueling customer's vehicles. Also, 126 (70%)
125 reported that they had guidelines for emergency action plan mentioning evacuation plan, fire
126 exits and fire assembly notices though 40% did not show any document to support it. Majority,
127 (57.8%) said that they did not have written policy statement for their company while those who
128 had, only 20% had them displaced at the front office. Only 34 (18.9%) reported undergoing
129 medical examination before or after commencement of work with the most commonly medical
130 test being chest examination 32 (94.1%), eye sight 10 (29.4) and blood sample 2 (5.9%). Most
131 of the respondents 143 (97.9%) who had not been subjected to medical examination stated that
132 medical examination was not done because it was not necessary. 143 (97.9%). Moreover, 87
133 (48.3%) had attended safety training the commonest being fire safety, 86 (98.9%) and first aid,
134 42 (48.3%).

135

Safety procedures and routine processes at workplace		
Variable	Frequency (n)	Percentage (%)
Work procedures	n=180	
Yes	165	91.7
No	15	8.3
Emergency preparedness and response	n=180	

plan		
Yes	126	70
No	74	30
*Type of Emergency preparedness and response plan	n=126	
Evacuation plan	54	42.9
Fire exits and fire assembly points	125	99.2
Safety policy statement	n=180	
Yes	104	57.8
No	76	42.2
Medical examination done	n=180	
Yes	34	18.9
No	146	81.1
*Type of medical examination tests done	n=34	
Eye Sight	10	29.4
Chest examination	32	94.1
blood sample	2	5.9
*Reasons medical examination not done	n=146	
Fit and well	9	6.7
Lack of awareness	15	10.3
It was not necessary	143	97.9
Supervisor/management are well known to me	13	8.9
Attended Safety training	n=180	
Yes	87	48.3
No	93	51.7

*Type of safety training	n=87	
First Aid	42	48.3
Fire	86	98.9
* Multiple responses		

136

137 Table 3: Safety procedures and routine processes at workplace *Source: Field data (2017)*

138

139 Discussion

140 The respondents in this study were majorly male young adults who had attained post primary
141 education, which is in agreement with findings of similar studies done in Brazil by Rocha et al
142 where male staff were 90.5% and in Nigeria by Ahmed where 75% of the respondents were
143 male. Possible reasons for young male dominating the workforce could be due to the fact that
144 pump operations and car servicing were considered to be strenuous and risky task since petrol
145 stations operates till late night. Majority of the respondents (84.4%) had work for less than 5
146 years. This could be due to the fact that the workforce was majorly young adult who may have
147 just started working after completing post primary education. All respondents were aware of
148 the occupational hazards associated with their job where more than one hazard/risk was
149 mentioned. Risk of fire was easily mentioned by all respondents and this may be due to
150 presence of fire extinguishers and warning sign “ No Smoking” conspicuously in areas of danger
151 including forecourt and offloading area, normally a requirement for licensing. The results concur
152 with Mutua and Fedha (2012) whom observed that majority of the petrol stations had scored a
153 56% regarding installation of fire safety equipment. However, less than a third of the
154 respondents reported having well stocked first aid in their workplace. It is likely that incase of
155 injury or sudden illness, the casualty will not be given emergency aid before being taken to the
156 nearest health facility. Common accidents including fuel splash on the attendant skin and
157 fingers pinched by pump handle were not reported as they were considered “normal”. These
158 incidents occurred mainly when the attendant is either tired or overwhelmed by work. This
159 implies that workers are mostly likely to be exposed to hydrocarbons which easily gets absorbed
160 into the body since only 6.7% reported use of PPE with the most commonly used being
161 apron/overall, 10 (83.3%) and the least used being gloves and face mask, 1 (8.3%) each.
162 Though, majority of the respondents had stated that PPE were provided by employer, the low
163 usage was attributed by the fact that their availability were only “on need basis” thus worn

164 during offloading which was considered to be hazardous. The findings are in agreement with
165 another study by Izudi *et al* (2017) where PPE use was low (15.6%). It is likely that both
166 employers and workers lack adequate information on the role of different PPEs in reducing
167 exposure to volatile compounds which are generated and released nearly in all the petrol station
168 operations. Most of the respondents 165 (91.7%) stated that they had define job descriptions
169 outlining how to perform their duties and were trained on use of work tool and equipment at their
170 workplace upon their employment, however, only 48.3% stated that they had attended safety
171 training the commonest being fire safety, 86 (98.9%) and first aid, 42 (48.3%). This finding
172 concurs with Cherono (2011), whom in her study on Occupational accidents in Hotels within
173 Eldoret town, stated that 55% of the respondents had trained on First Aid. This implies most
174 employees at work place are not trained on health and safety issues thus likely to be ignorant in
175 occupational Safety and Health management systems (Njeru, 2015). This is despite the fact that
176 safety training should be carried at induction, on job and in refresher courses (Grimaldi and
177 Simons, 2003) and supplemented by placing posters and sign at strategic areas within petrol
178 station. Multitasking was evident in most stations where pump attendant would refuel more than
179 one vehicle at a go, wash windscreen and charge for the services. Similarly, staff from front
180 office and car servicing section could also be seen refueling customers vehicles. The findings
181 collaborate with another study by Racho *et al* (2014) on use of personal protective equipment by
182 gas stations in Brazil. Multitasking may be as a result of petrol station employing few staff in a
183 busy workplace compelling staff to perform two task or more simultaneously in order to handle
184 the workload. Though majority of the respondents had stated that they had guidelines for
185 emergency action plan, nearly a half of the petrol stations did not show any documents to
186 support it and those who had, had displayed evacuation plan, fire exits and fire assembly point
187 notices. Though, a fifth of the respondents reported presence of a written and publicized safety
188 policy statement and risk assessment audit reports, these crucial safety documents were not
189 freely accessible by staff since some stations had them either filed or pinned at the manager's
190 office thus limiting their accessibility. The possible reasons for lack of a well-defined emergency
191 action plan and policy statement may be attributed to the fact that safety related issues had not
192 reached all the petrol stations. In terms of medical examination, only 34 (18.9%) reported
193 undergoing either pre-employment medical examination or periodic medical examination with
194 the most commonly medical test being chest examination 32 (94.1%), eye sight 10 (29.4) and
195 blood sample 2 (5.9%). Most of the respondents 143 (97.9%) who had not been subjected to
196 medical examination stated that medical examination was not done because it was not

197 necessary contrary to the fact that the fact that petrol stations attendants are likely to be
198 exposed to occupational hazards (Harrington et al., 1998).

199 **CONCLUSION**

200 The findings of this study shows that most petrol stations did not have written and publicized
201 safety statement, emergency preparedness and action plan and medical examination to
202 workers. Most workers perform multiple tasks, non-usage of PPE such as gloves, aprons, boots
203 and face mask was evident, and even by those who said had PPE, which is in agreement with
204 other similar studies. Though, majority of the petrol stations had warning sign, fire extinguishers
205 and sand bucket conspicuously at the forecourt, less than a third of the respondents reported
206 having well stocked first aid in their workplace. Moreover, most of the respondents did not know
207 how to use them in case of emergency. The findings of the study clearly indicates that majority
208 of the petrol stations either lacked or did not have well defined an occupational health and
209 safety management system leading to low level of their implementation. There is need of
210 Occupational Safety and Health Management System (OSHMS) to be integrated within petrol
211 stations policy in order to reduce the operations mistakes, costs of reducing problems and level
212 of risks while ensuring that they comply with laws and regulations.

213 **ETHICAL CONSIDERATION**

214 Permissions to conduct the research, research clearance permit were obtained from National
215 Commission for Science, Technology and Innovation (NACOSTI). Consent was also sought
216 from office of Nakuru County Commissioner, Ministry of Education (Moe) and
217 proprietors/managers of the petrol stations where the study was carried out. The researcher
218 clearly explained the purpose of the study to the respondents and their consent sought as
219 indicated in the preamble of the questionnaire. Names of the respondents and place of work
220 were not included in the questionnaire. The respondents were coded and the codes only known
221 to the researcher. Some photos taken as part of observational tool had either the petrol station
222 name censored or faces of attendants blurred to protect anonymity and privacy of the
223 respondents.

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